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The effectiveness of pursed lips breathing in the management of breathlessness in stable chronic obstructive pulmonary disease

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Abstract

Introduction: This dissertation aims to explore, in a clinical setting, the effectiveness of pursed lips breathing (PLB), in the management of dyspnoea in stable COPD.

Methodology: A mixed methodology that comprised a randomised controlled trial (RCT), a predominantly qualitative follow-up (FU) study and two measurement studies was used. The RCT intervention group was taught PLB at home over 8 weeks. Primary outcome measures were the Self Report Chronic Respiratory Disease Questionnaire (CRQ-SR) dyspnoea and mastery domains and Endurance Shuttle Walk Test (ESWT). The FU study investigated the long-term experience of PLB in a subset of RCT participants through telephone interview, focus group and observation of PLB technique at home visit. Prior to the RCT a study using limits of agreement (LoA) methodology was conducted to investigate reliability of hand-held spirometric measurement of inspiratory capacity (IC) with a view to using it as an outcome measure. Following the RCT a retrospective analysis of data collected from the ESWT was performed comparing a 1-walk protocol with the published 2-walk protocol.

Results: Forty-one patients with COPD were recruited to the RCT (PLB n = 22, control n =19); mean age 68 years (SD 11), mean FEV_1% predicted 47% (SD 15.80) and 13 were approached to participate in the FU; 11 of 13 agreed to telephone interview, 5 to attend the focus group and 6 to home visit. The median time since learning PLB was 17 months (6 - 23). The **RCT** found no statistically significant difference between groups in the primary outcome measures and in retrospect was insufficiently powered. *Post hoc* analysis found effect sizes for primary outcome measures were: CRQ-SR dyspnoea 0.05, CRQ-SR mastery 0.48 and ESWT 0.44. For secondary outcome measures the PLB group showed a significant (p = 0.02) improvement in oxygen saturation on ESWT. **Long-term follow-up** found 9 of 11 still used PLB, 8 reported definite benefit. Those using PLB used it for breathlessness with four themes identified: use of PLB with physical activity (8/11), to increase confidence and reduce panic (4/11), as an exercise (3/11), at night (3/11). Discontinuation of PLB (2/11) was due to no benefit. **Hand-held spirometric measurement of IC** found LoA for same-day IC measurement in healthy volunteers (n = 20) ± 0.630L (95%CI ± 0.255) and over 3 weeks (n = 11) ± 0.560L (95%CI ± 0.326). In COPD, same day LoA (n = 26) were ± 0.582L (95%CI ± 0.169) and over 6 weeks (n = 8) ± 0.486L (95%CI ± 0.302). **Retrospective analysis of ESWT data** identified that completion rates improved by 17% for the 1-walk protocol but that the ceiling-effect was 12.2% compared to 7.3% for the 2-walk protocol. LoA between protocols when measuring change over time (n = 31) was ±80% (95%CI 25.56); less than the difference described as "somewhat better" (113%) following pulmonary rehabilitation (PR) but greater than the m.c.i.d. of 68%.

Conclusions: LoA for IC exceeded the clinically significant reported 0.3L; the protocol tested here was not sufficiently reliable for use as an outcome measure. Analysis of ESWT data showed the 1-walk protocol was adequate for identify change in clinical practice but, for research purposes the 2-walk protocol should be retained. From the RCT learning PLB resulted in reduced physiological stress with respect to oxygen desaturation when performing ESWT compared to the control group. Long-term follow-up showed that, in severe COPD perceived benefits persisted in 62% of patients.

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Table of contents

Abstract ii

Acknowledgments iii

Table of contents iv

Table of Figures xi

Table of Tables xiv

List of Appendices xvii

List of abbreviations xx

1 Introduction 2

1.1 Overview 2

1.2 Publications arising from the work presented in this dissertation 3

1.3 Context 4

1.3.1 COPD: incidence and burden 4

1.4 Pathophysiology of breathlessness 6

1.4.1 Definitions 6

1.4.2 Neuro-regulatory factors 7

1.4.3 Mechanical factors 7

1.5 Psychological factors 10

1.5.1 Summary 10

1.6 Overview of the management of breathlessness in COPD 10

1.6.1 Smoking cessation 11

1.6.2 Bronchodilator Therapy 11

1.6.3 Inhaled glucocorticosteroids 13

1.6.4 Reduction in exacerbation frequency 13

1.6.5 Pulmonary Rehabilitation 14

1.6.6 Oxygen supplementation and Non-Invasive Ventilation 14

1.6.7 Treatment of cor pulmonale 15

1.6.8 Opiates 15

1.6.9 Surgical interventions 16

1.7 Overview of physiotherapy management of breathlessness in COPD 17

2 Pursed lips breathing: Literature review 20

2.1 Introduction 20

2.2 Literature review methodologies 21

2.3 Results 22

2.3.1 2005 literature search findings 23
2.3.2 2008 Literature search findings 37
2.3.3 Discussion: 2008 literature search 48
2.3.4 Conclusion and implications for research 53
3 Outcome measures 56
3.1 Introduction 56
3.1.1 Use of literature searches and ICF to inform choice of outcome measures to investigate use of PLB in COPD 57
3.2 Methodology: measuring intervention in long-term conditions and outcome measurement in COPD 60
3.3 Results: measuring intervention in long-term conditions 61
3.3.1 Models for measuring outcome in long-term conditions management 61
3.3.2 Defining quality of life (QoL) 62
3.3.3 The important domains of quality of life 62
3.3.4 Issues with quality of life measurement 63
3.4 Discussion: measuring intervention in long-term conditions 64
3.5 Conclusion: measuring interventions in long-term conditions 65
3.6 Results: measuring intervention in COPD 66
3.6.1 Factors effecting health related quality of life in COPD 66
3.6.2 Measuring health related quality of life in COPD 69
3.6.3 Characteristics of outcome measures 71
3.7 Discussion: measuring intervention in COPD 73
3.8 Conclusion: measuring intervention in COPD 74
3.9 Methodology: identifying specific outcome measures for PLB study 75
3.10 Results: identifying specific outcome measures for PLB study 76
3.10.1 Generic versus specific measures of health related quality of life 76
3.10.2 Disease specific measures of health related quality of life 76
3.10.3 Dyspnoea measures 77
3.10.4 Dynamic Hyperinflation 78
3.10.5 Exercise capacity 79
3.10.6 Anxiety and Depression 80
3.11 Description of outcome measures chosen for PLB study 80
3.11.1 Chronic Respiratory Disease Questionnaire (CRQ) 80
3.11.2 Endurance Shuttle Walk Test (ESWT) 82
3.11.3 Modified Borg scale of perceived breathlessness 84

3.11.4 Inspiratory capacity (IC) 85
3.11.5 Medical Research Council (MRC) dyspnoea scale 86
3.11.6 Hospital Anxiety and Depression Scale (HADS) 87
3.12 Discussion 88
3.13 Conclusion 88
4 Measurement of inspiratory capacity 94
4.1 Introduction: Dynamic Hyperinflation and Inspiratory Capacity 94
4.2 Methodology: Healthy volunteer study 95
4.2.1 Predicted inspiratory capacity 96
4.2.2 Statistical method 96
4.3 Results: Healthy volunteer study 97
4.3.1 Demographics 97
4.3.2 IC measurement 98
4.3.3 Limits of agreement between two operators measuring IC on the same subject on the same day 99
4.3.4 Limits of agreement for the same operator, 3 weeks apart 100
4.3.5 Summary of results 103
4.4 Introduction to Stable COPD study 104
4.5 Methodology: COPD study 104
4.5.1 Inclusion criteria: 105
4.5.2 Exclusion criteria: 105
4.5.3 Statistical Method: 105
4.6 Results: COPD study 106
4.6.1 Demographics 106
4.6.2 IC measurement 106
4.6.3 Same day limits of agreement 109
4.6.4 Limits of agreement over time 110
4.6.5 Summary of results 111
4.7 Summary of key results from both studies 111
4.8 Discussion of results from both studies 111
4.9 Conclusions 113
5 An investigation into the effects of PLB in stable COPD 115
5.1 Introduction 115
5.2 Summary of main study protocol 115
5.2.1 Population, study duration and description of intervention 115

5.2.2 Research questions and outcome measures 116
5.2.3 Summary of protocol 117
5.2.4 Inclusion criteria 117
5.2.5 Exclusion criteria 118
5.2.6 Permitted medication 119
5.2.7 Proscribed medications/therapies 120
5.2.8 Criteria for Discontinuation of Study Intervention 120
5.2.9 Substantial amendments 121
5.2.10 Statistical Considerations 122
5.2.11 Randomisation 123
5.2.12 Ethical approval 123
5.3 Methodology 124
5.3.1 Recruitment 124
5.3.2 Baseline assessment 125
5.3.3 Home Visit 1 (HV1) 126
5.3.4 Intervention 127
5.3.5 Home Visit 2 (HV2) 128
5.3.6 Discharge assessment 128
5.3.7 Statistical analysis 129
5.4 Results 130
5.4.1 Demographics 130
5.4.2 Exacerbations, deviations from protocol and adverse reactions 131
5.4.3 CRQ-SR analysis 134
5.4.4 Performance of ESWT 142
5.4.5 ESWT and associated secondary outcome measures analysis 142
5.4.6 Results of HADS score measurements 157
5.4.7 Results of MRC dyspnoea scale scores 159
5.4.8 Observed and subjective response to PLB at HV1 and HV2 159
5.5 Discussion 160
5.5.1 Study design 160
5.5.2 Study population 161
5.5.3 Study methodology 163
5.5.4 Study power 166
5.5.5 Effects of PLB used at rest 168
5.5.6 Changes in primary outcome measures 168

5.5.7 Predictors of benefit 171
5.6 Conclusion 171
6 Comparison of two ESWT protocols 173
6.1 Introduction 173
6.2 Methodology 174
6.2.1 Participants 174
6.2.2 ESWT protocols 174
6.2.3 Statistical analysis 175
6.3 Results 176
6.3.1 Demographics 176
6.3.2 ESWT completion rates 176
6.3.3 Ceiling effect for standard and 1-walk ESWT protocol 177
6.3.4 Floor effect for standard and 1-walk ESWT protocol 178
6.3.5 ESWT limits of agreement for same-day performance of standard protocol and 1-walk protocol 178
6.3.6 ESWT limits of agreement for percentage change measured by standard protocol and 1-walk protocol over 6 – 8 weeks 181
6.3.7 ESWT limits of agreement for percentage change measured by standard protocol and 1-walk protocol over 6 – 8 weeks, excluding outlier 183
6.4 Discussion 184
6.4.1 Limits of agreement when comparing change 185
6.4.2 Ceiling and floor rates 185
6.4.3 Implications of selection of second or longest ESWT as the test result 186
6.5 Conclusions 187
7 The long-term experience of COPD patients taught PLB 190
7.1 Introduction 190
7.2 Methodology 192
7.2.1 Study design 192
7.2.2 Ethical approval 193
7.2.3 Recruitment process 193
7.2.4 Telephone interview 194
7.2.5 Focus group 194
7.2.6 Analysis of interview and focus group 195
7.2.7 Home visit 195
7.2.8 Analysis of PLB observation 196

7.3 Results 196
7.3.1 Demographics 196
7.3.2 Perceived benefit from PLB 199
7.3.3 Recall of learning PLB 200
7.3.4 First reasons given for using PLB 201
7.3.5 Themes extracted from telephone interview transcripts 201
7.3.6 Focus group exploration of themes in relation to PLB use 202
7.3.7 Re-enforcement of initial PLB learning 203
7.3.8 Setting for learning PLB 204
7.3.9 PLB technique 205
7.3.10 Negative effects of PLB 206
7.3.11 PLB and short-acting bronchodilators 206
7.3.12 How PLB works 206
7.3.13 Observation of current PLB 207
7.4 Discussion 209
7.4.1 Study design 209
7.4.2 Role of the researcher 211
7.4.3 Validity and limitations 212
7.4.4 Expectations of PLB 214
7.4.5 PLB and subsequent attendance at pulmonary rehabilitation 214
7.4.6 Differences in reported experience with PLB 215
7.4.7 Variation in PLB technique 215
7.4.8 Unexpected findings 216
7.4.9 Characteristics of those reporting no benefit from PLB 217
7.4.10 Negative effects of PLB 217
7.4.11 Observations of Focus Group facilitator and scribe 217
7.5 Conclusions 218
8 Final Discussion 221
8.1 Context 221
8.2 Recently published studies 223
8.3 Impact of placebo effect 226
8.4 Findings for CRQ-SR 227
8.4.1 Dyspnoea domain 227
8.4.2 Mastery domain 230
8.5 ESWT and associated measures 230

8.6 Findings of qualitative study 231
8.7 Are we asking the right question? 232
8.8 Summing up 234
8.9 Conclusion 235
8.9.1 Reliability of hand-held spirometric measurement of inspiratory capacity 235
8.9.2 Requirement for two walks when conducting the ESWT 236
8.9.3 Benefit from PLB 236
9 References 239
10 Appendices 253
10.1 Appendix to chapter 2 253
10.2 Appendix to chapter 3 256
10.3 Appendix to chapter 4 272
10.4 Appendix to chapter 5 278
10.5 Appendix to chapter 6 304
10.6 Appendix to chapter 7 305